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PATENT

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In re Application of

Taisto YRJÄNÄ et al

Application No: 10/049,153

Filed: April 26, 2003

Art Unit: 3749 APR - 2 2004

Examiner:
Gregory A. Wilson**OFFICIAL**For: APPARATUS FOR SUPPORTING MATERIAL TO
BE TREATED IN CONTINUOUSLY OPERATED
THERMAL TREATMENTREPLY TO THE OFFICE ACTION MAILED 12/05/2003COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

Further examination and consideration of this application are
requested in view of the following Amendments and Remarks.

AMENDMENTS

1-16 (Canceled)

17. (Currently Amended) A support apparatus for supporting material to be treated in a continuously operated thermal treatment furnace, said apparatus comprising:

an elongate gas control element having a central axis and having first and second guide surfaces, and

first and second substantially cylindrical support elements of substantially equal diameter D and each having a central axis, the central axis of each support element being parallel to the central axis of the gas control element and being spaced at a distance S from the central axis of the gas control element, and the central axes of the control element and the support elements being disposed in a common plane,

wherein the gas control element is located between the support elements with the first and second guide surfaces of the gas control element facing towards the first and second support elements respectively, the guide surfaces are spaced from the support elements to provide a gas flow channel between each support element and the gas control element, the gas control element includes two lobes that extend to opposite respective sides of said common plane, and each lobe extends radially from the central axis of the gas control element to a distance of at least $(D/2 + S)$, and the gas control element is wholly contained between a first plane that is perpendicular to the common plane and intersects the central axis of the first support element and a second plane that is perpendicular to the common plane and intersects the central axis of the second support element.

18. (Previously Presented) An apparatus according to claim 17, wherein the gas flow channel increases in width with distance from the common plane.

19. (Previously Presented) An apparatus according to claim 17, wherein the first guide surface has a center of curvature that is farther than the central axis of the first support element from the central axis of the control element.

20. (Currently Amended) An apparatus according to claim 17, wherein each lobe of the gas control element has an outermost surface region at a distance R from the central axis of the ~~support element~~, gas control element.

21. (Previously Presented) An apparatus according to claim 20, wherein the diameter D of each support element is substantially equal to $2(R-S)$.

22. (Previously Presented) An apparatus according to claim 17, further comprising two sealing elements and wherein the gas control element is located between the two sealing elements.

23. (Previously Presented) An apparatus according to claim 22, comprising two intermediate support elements disposed between the gas control element and the sealing elements respectively.

24. (Previously Presented) An apparatus according to claim 22, wherein each sealing element is provided with a flow-through type cooling agent circulation.

25. (Previously Presented) An apparatus according to claim 17, wherein the gas control element is composed of at least two successive segments and the apparatus comprises an intermediate support element between the segments of the gas control element.

26. (Previously Presented) An apparatus according to claim 17, wherein the control element is curved over essentially its entire external surface.

27. (Previously Presented) An apparatus according to claim 17, wherein each support element is provided with a flow-through type cooling agent circulation.

28. (Previously Presented) An apparatus according to claim 17, wherein the control element is provided with a flow-through type cooling agent circulation.

29. (Currently Amended) A continuously operated thermal treatment furnace comprising support apparatus for supporting material to be treated in the furnace, said apparatus comprising:

an elongate gas control element having a central axis and having first and second guide surfaces, and

first and second substantially cylindrical support elements of substantially equal diameter D and each having a central axis, the central axis of each support element being parallel to the central axis of the gas control element and being spaced at a distance S from the central axis of the gas control element, and the central axes of the control element and the support elements being disposed in a common plane,

wherein the gas control element is located between the support elements with the first and second guide surfaces of the gas control element facing towards the first and second support elements respectively, the guide surfaces are spaced from the support elements to provide a gas flow channel between each support element and the gas control element and enable flow of gas used in treatment of the material between the support element and the control element, the gas control element includes two lobes that extend to opposite respective sides of said common plane, each lobe extends radially from the central axis of the gas control element to a distance of at least $(D/2 + S)$, the gas control element is wholly contained between a first plane that is perpendicular to the common plane and intersects the central axis of the first support element and a second plane that is perpendicular to the common plane and intersects the central axis of the second support element, and the gas control element constitutes part of a seal of the thermal treatment furnace.

30. (Previously Presented) A thermal treatment furnace according to claim 29, wherein the gas flow channel increases in width with distance from the common plane.

31. (Previously Presented) A thermal treatment furnace according to claim 29, wherein the first guide surface has a center of curvature that is farther than the central axis of the first support element from the central axis of the control element.

32. (Currently Amended) A thermal treatment furnace according to claim 29, wherein each lobe of the gas control element has an outermost surface region at a distance R from the central axis of the ~~support element~~ gas control element.

33. (Currently Amended) A thermal treatment furnace according to claim 29, wherein the diameter D of each cylinder support element is substantially equal to ~~2(R-S)~~ 2(R-S).

34. (Previously Presented) A thermal treatment furnace according to claim 29, wherein said support apparatus further comprises at least two sealing elements and the control element is installed between the two sealing elements so that the sealing elements direct gas flow underneath the material to be supported, between the support element and the control element.

35. (Previously Presented) A thermal treatment furnace according to claim 34, wherein the support apparatus comprises two intermediate support elements located between the control element and the sealing elements respectively.

36. (Previously Presented) A thermal treatment furnace according to claim 34, wherein each sealing element is provided with a flow-through type cooling agent circulation.

37. (Previously Presented) A thermal treatment furnace according to claim 29, wherein the gas control element is composed of at least two successive segments and the apparatus comprises an intermediate support element between the segments of the control element.

38. (Previously Presented) A thermal treatment furnace according to claim 29, wherein the control element is curved over essentially its entire external surface.

39. (Previously Presented) A thermal treatment furnace according to claim 29, wherein each support element is provided with a flow-through type cooling agent circulation.

40. (Previously Presented) A thermal treatment furnace according to claim 29, wherein the control element is provided with a flow-through type cooling agent circulation.